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Agency Secretary

Air Resources Board

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Arnold Schwarzenegger
Governor

MEMORANDUM

TO: Tobi Jones, Ph.D., Assistant Director
Department of Pesticide Regulation

FROM: Janette Brooks, Chief
Air Quality Measures Branch

DATE: May 7, 2004

SUBJECT: COMMENTS ON DRAFT SULFURYL FLUORIDE TOXIC AIR CONTAMINANT EVALUATION

At your request, we reviewed the draft "Sulfuryl Fluoride Risk Characterization Document," dated March 16, 2004. We reviewed the portions of the document related to environmental fate and outdoor public exposure (referred to in the document as bystander exposure). Overall, we found the document to be well written and comprehensive. We have a few comments, which are attached.

Thank you for the opportunity to review the draft document. If you have questions regarding our comments, please call me at (916) 322-7072, or have your staff contact Mr. Jim Aguila, Manager, Substance Evaluation Section, at (916) 322-8283.

Attachment

cc: Mr. Jim Aguila, Manager (w/Attachment)
Substance Evaluation Section
Air Resources Board

Comments on draft "Sulfuryl Fluoride Risk Characterization Document"

1. Bystander exposure near non-food commodity fumigation – On page 48, section IV.B.2.c. describes bystander exposure near non-food commodity fumigation. Bystander exposure was assumed to be five days per week, with the exposures at "an assumed 5 ppm air level due to lack of data." This may not be a health-protective assumption with regard to acute exposure. The 5 ppm air level is the 8-hour permissible exposure level for workers. We assume that information exists on the concentrations of sulfuryl fluoride inside a non-food commodity fumigation operation, since the operators would need that information to ensure efficacy. We recommend that an attempt be made to estimate (by way of near-source air dispersion modeling) the 1-2 hour exposure to bystanders during aeration of a non-food commodity fumigation operation, similar to the exposure assessment for bystanders near the aeration of a structural fumigation.

   Similarly, on page 67, section V.C.2. states that for non-food commodity fumigation, the exposures for all exposure groups were overestimated. Until the acute exposure is estimated, as discussed in the previous paragraph, we do not believe that the document can state that acute exposure to bystanders has been overestimated.

2. Environmental fate – Appendix A presents the environmental fate of sulfuryl fluoride in water, soil and biota, but not air. We recommend including any available information on fate of sulfuryl fluoride in air (e.g., atmospheric lifetime or atmospheric breakdown products under typical use scenarios).

3. Annual use – Table 2 in Appendix A presents use of sulfuryl fluoride in California in 2001. Pesticide use data for 2002 are available on the Department of Pestidide Regulation web site. Hence, we recommend either updating the use data in Table 2 with the 2002 use or presenting use data for the most recent two or three years to show the upward trend in use. The use data presented in Table 2 of Appendix C also could be updated through 2002.

4. Exposure assessment – Appendix C presents the exposure assessment. We recommend that the first page of Appendix C be labeled as being Appendix C.

   On page 52, bystander exposure is described. The exposure assessment is based on monitoring studies conducted during the aeration of structural fumigations. No information is provided as to the location of the monitors with respect to distance from the structure and wind direction to determine if the monitors were at points of expected maximum downwind concentration during the aeration. If such information exists, we recommend including it in the data summary. If not, we recommend noting this as an uncertainty regarding the exposure data.

Page A-14 refers to Table A-1regarding the average analytical recovery, stated as 66.1%. This reference appears to be incorrect and should be Table A-7 with an average recovery of 97.76%. Also, Table A-7 contains footnotes i and j, but these are not listed at the bottom of the table.

Page A-17 refers to Tables A-2 and A-3. These should be Tables A-8 and A-9.

Pages A-27-28 note that "although stack aeration appears to result in lower bystander exposures, it would not be appropriate to compare estimates for the different aeration methods since phase one only has 2 replicates, and both phases use different houses." No information is provided about whether samplers during the stack aeration monitoring were at an appropriate distance and direction to measure the expected maximum downwind concentration. Simple air dispersion modeling would indicate that the maximum concentration downwind of a stack aeration (a point source) should be higher (because emissions are limited to one release point and plume) than downwind of a TRAP aeration (ten minute stack release followed by tarp removal and active aeration through open windows). We recommend that the statement that stack aeration appears to result in lower bystander exposures be modified to reflect the possibility that the monitors downwind of the stack aeration may not have measured the maximum downwind concentrations.

Department of Pesticide Regulation

Paul Gosselin
Acting Director

M E M O R A N D U M

Arnold Schwarzenegger
Governor

TO: Gary Patterson, Ph.D.
Supervising Toxicologist
Medical Toxicology Branch

VIA: Keith Pfeifer, Ph.D., DABT [*original signed by Keith Pfeifer*]
Senior Toxicologist
Medical Toxicology Branch

FROM: Lori O. Lim, Ph.D., DABT [*original signed by Lori Lim*]
Staff Toxicologist
(916) 324-3515

DATE: July 30, 2004

SUBJECT: RESPONSE TO COMMENTS FROM THE AIR RESOURCES BOARD ON THE DRAFT SULFURYL FLUORIDE RISK CHARACTERIZATION DOCUMENT

This memorandum addresses comments from the Air Resources Board (ARB) on the draft Risk Characterization Document (RCD) for the active ingredient sulfuryl fluoride in Vikane® (March 16, 2004). The only comment on risk characterization was in Comment 1 where ARB disagreed with the statement that acute exposure to bystanders had been overestimated. ARB indicated that the 5 ppm assumption used by the Worker Health and Safety Branch was an underestimate of exposure. The RCD has been revised to indicate the could be higher if the use was more frequent, especially when food uses are approved in California. On the other hand, the exposure could be lower with shorter time spent outdoors.

ARB also commented on use report and environmental fate information in Appendix A. The Environmental Monitoring Branch has revised the Appendix to include 2001 and 2002 use information. There is no environmental fate information on sulfuryl fluoride available.

Department of Pesticide Regulation

Paul Gosselin
Acting Director

Arnold Schwarzenegger
Governor

M E M O R A N D U M

TO: Joseph P. Frank, D.Sc.
Senior Toxicologist
Worker Health and Safety Branch

FROM: Donna DiPaolo, Ph.D. *(original signed by D. DiPaolo)*
Associate Toxicologist
916-445-4262

DATE: July 27, 2004

SUBJECT: RESPONSE TO COMMENTS FROM THE AIR RESOURCES BOARD ON THE DRAFT SULFURYL FLUORIDE RISK CHARACTERIZATION DOCUMENT.

This memorandum addresses comments directed to the exposure assessment sections of the Sulfuryl Fluoride Risk Characterization Document (RCD; March 16, 2004) provided by the Air Resources Board (ARB). The comments have been considered and the Worker Health and Safety Branch response is provided below. The RCD main text and Appendix C (Exposure Assessment) has been revised when applicable.

Comment 1:
a) On page 48, there was a question as to whether using 5 ppm as an assumed air concentration for bystanders near non-food commodity fumigation facilities is health protective, and the use of near-source air dispersion modeling was suggested as an alternative.

b) On page 67, the RCD states that the exposures for all exposure groups were overestimated.

Response 1:
a) To date, DPR does not have access to ambient air monitoring during nonfood commodity fumigations. WHS assumes that employers will manage sulfuryl fluoride air levels surrounding fumigation chambers to be at or below the permissible exposure limit (PEL) to negate the need for employee-bystanders to wear respiratory protection during the work-day. Until ambient air data are available for nonfood commodity facilities, 5 ppm is an appropriate air concentration to use in estimating bystander exposure.

b) Based on the infrequent use of sulfuryl fluoride in nonfood commodity fumigation (see Appendix C, Table 2, Pesticide Use Report Data), it is not expected that workers or bystanders would be exposed to sulfuryl fluoride from this use for more than one day per year. As noted in the exposure appraisal of Appendix C (Exposure Assessment), if sulfuryl fluoride use in commodity fumigation changes in the future (e.g., addition of use in food commodities), this scenario would be reevaluated.

Comment 3:
The use data in Table 2 of Appendix C also could be updated through 2002.

Response 3:
The data has been updated.

Comment 4:
a) It is recommended that the first page of Appendix C be labeled as such.

b) On page 52, there is no information describing the location of air monitors used in determining bystander air concentrations.

c) Page A-14 incorrectly refers to Table A-1 rather than Table A-7; and Table A-7 contains footnotes i and j with no reference text.

d) Page A-17 should refer to Tables A-8 and A-9, not Tables A-2 and A-3.

e) Pages A-27-28: ARB suggests the possibility that monitors during stack aeration may not have measured the maximum downwind air concentrations.

Response 4:
a) The RCD has been revised to include a cover sheet identifying Appendix C.

b) Locations of air monitors have been described.

c-d) Appendix C (Exposure Assessment) has been revised to reflect the appropriate inhalation absorption factor in concurrence with the RCD main text. Text table references and table numbering has been revised accordingly.

e) The exposure assessment has been revised to state the uncertainty of sulfuryl fluoride air levels at distances beyond the sampling stations. It has also been noted that indoor air levels of adjacent or downwind structures have not been monitored.

May 25, 2005

Responses to ARB Comments on the Draft Sulfuryl Fluoride Toxic Air Contaminant Evaluation Relevant to Environmental Fate

Comment 1:
We recommend including any available information on the fate of sulfuryl fluoride in air (e.g. atmospheric lifetime or atmospheric breakdown products under typical use patterns).

Response:
A search of the open science literature produced no citations relevant to the fate of sulfuryl fluoride in atmosphere (atmospheric lifetime or atmospheric breakdown products), or if it absorbs light at wavelengths greater than 290 nm.

Comment 2:
We recommend updating the use data in Table 2 with the 2002 use or presenting use data for the most recent two or three years to show the upward trend in use.

Response
The document was revised to include 2002 use data.

Wynetta S. Kollman, Ph.D.
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